

Docket No. ESEC-P32US-D1

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1-14. (Canceled)

15. (Currently Amended) An apparatus used as a component of a die bonder for placing a semiconductor chip on a substrate, comprising:

a first pivoted lever seated at one end on a first shaft, said first shaft mounted equidistantly between a first location and a second location;

a drive coupled to said first shaft for pivoting said first pivoted lever in alternating pivoting directions through an angle of pivoting, Φ , between a first end position in which said first pivoted lever is directed toward said first location and a second end position in which said first pivoted lever is directed toward said second location;

a second pivoted lever mounted by means of a second shaft located at another end of said first pivoted lever, a sum of lengths of said first and second pivoted levers equalling a distance from said first shaft to said first location or said second location, said first and second pivoted levers pivoting in horizontal planes;

a drive mechanism for rotating said second pivoted lever in an opposite pivoting direction and with a predetermined gear ratio with respect to said first pivoted lever, the

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drive mechanism coupling said first and second pivoted lever such that the second pivoted lever is in an extended position with respect to said first pivoted lever when the first pivoted lever is in said first end position or said second end position, the predetermined gear ratio, n, being defined by the formula $n=360^\circ/\Phi$; and

a semiconductor chip gripper seated at an opposing end of said second pivoted lever.

16. (Previously Amended) The apparatus according to claim 15 wherein the angle of pivoting of said first pivoted lever between said first and said second end positions equals 120° .

17. (Previously Amended) The apparatus according to claim 15 wherein said drive mechanism comprises:

a first toothed wheel coaxial to said first shaft;
a second toothed wheel coupled coaxially to said second shaft; and
a belt looped around and engaging said first and second toothed wheels.

18. (Previously Amended) The apparatus according to claim 15 wherein said drive mechanism comprises:

a first toothed wheel coaxial to said first shaft;
a second toothed wheel coupled coaxially to said second shaft; and
an intermediate toothed wheel engaging said first and second toothed wheels.

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19. (Previously Amended) The apparatus according to claim 16 wherein said drive mechanism comprises:

a first toothed wheel coaxial to said first shaft;

a second toothed wheel coupled coaxially to said second shaft; and

a belt looped around and engaging said first and second toothed wheels.

20. (Previously Amended) The apparatus according to claim 16 wherein said drive mechanism comprises:

a first toothed wheel coaxial to said first shaft;

a second toothed wheel coupled coaxially to said second shaft; and

an intermediate toothed wheel engaging said first and second toothed wheels.

21. (Previously Amended) The apparatus according to claim 17 wherein a gear ratio of said first toothed wheel and said second toothed wheel equals three.

22. (Previously Amended) The apparatus according to claim 18 wherein a gear ratio of said first toothed wheel and said second toothed wheel equals three.

23. (Previously Amended) The apparatus according to claim 19 wherein a gear ratio of said first toothed wheel and said second toothed wheel equals three.

24. (Previously Amended) The apparatus according to claim 20 wherein a gear ratio of said first toothed wheel and said second toothed wheel equals three.



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25. (Previously Amended) The apparatus according to claim 15 wherein said chip gripper is rigidly connected to said opposing end of said second pivoted lever.
26. (Previously Amended) The apparatus according to claim 15, further comprising first and second delimiters arranged laterally to a direction of movement of said chip gripper and operable to guide said chip gripper during times when said first pivoted lever is conforming or disconforming to said end positions.
27. (Previously Amended) The apparatus according to claim 16, further comprising first and second delimiters arranged laterally to a direction of movement of said chip gripper and operable to guide said chip gripper during times when said first pivoted lever is conforming or disconforming to said end positions.
28. (Previously Amended) The apparatus according to claim 17, further comprising first and second delimiters arranged laterally to a direction of movement of said chip gripper and operable to guide said chip gripper during times when said first pivoted lever is conforming or disconforming to said end positions.
29. (Previously Amended) The apparatus according to claim 18, further comprising first and second delimiters arranged laterally to a direction of movement of said chip gripper and operable to guide said chip gripper during times when said first pivoted lever is conforming or disconforming to said end positions.

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30. (Previously Amended) The apparatus according to claim 19, further comprising first and second delimiters arranged laterally to a direction of movement of said chip gripper and operable to guide said chip gripper during times when said first pivoted lever is conforming or disconforming to said end positions.

31. (Previously Amended) The apparatus according to claim 20, further comprising first and second delimiters arranged laterally to a direction of movement of said chip gripper and operable to guide said chip gripper during times when said first pivoted lever is conforming or disconforming to said end positions.

32. (Previously Amended) The apparatus according to claim 21, further comprising first and second delimiters arranged laterally to a direction of movement of said chip gripper and operable to guide said chip gripper during times when said first pivoted lever is conforming or disconforming to said end positions.

33. (Previously Amended) The apparatus according to claim 22, further comprising first and second delimiters arranged laterally to a direction of movement of said chip gripper and operable to guide said chip gripper during times when said first pivoted lever is conforming or disconforming to said end positions.

34. (Previously Amended) The apparatus according to claim 23, further comprising first and second delimiters arranged laterally to a direction of movement of said chip

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gripper and operable to guide said chip gripper during times when said first pivoted lever is conforming or disconforming to said end positions.

35. (Previously Amended) The apparatus according to claim 24, further comprising first and second delimiters arranged laterally to a direction of movement of said chip gripper and operable to guide said chip gripper during times when said first pivoted lever is conforming or disconforming to said end positions.

36. (Previously Amended) The apparatus according to claim 25, further comprising first and second delimiters arranged laterally to a direction of movement of said chip gripper and operable to guide said chip gripper during times when said first pivoted lever is conforming or disconforming to said end positions.

37. (Original) The apparatus according to claim 15, further comprising delimiter means for guiding said chip gripper at least during times when said first pivoted lever is conforming or disconforming to said end positions.

38. (Original) The apparatus according to claim 17, further comprising delimiter means for guiding said chip gripper at least during times when said first pivoted lever is conforming or disconforming to said end positions.

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39. (Original) The apparatus according to claim 18, further comprising delimiter means for guiding said chip gripper at least during times when said first pivoted lever is conforming or disconforming to said end positions.

40. (Currently Amended) An apparatus for placing a semiconductor chip on a major surface of a substrate, comprising:

a first pivoted lever seated at one end on a first shaft, said first shaft mounted equidistantly between a first location and a second location; a drive coupled to said first shaft for pivoting said first pivoted lever in alternating pivoting directions through an angle of pivoting, Φ , between a first end position in which said first pivoted lever is directed toward said first location and a second end position in which said first pivoted lever is directed toward said second location;

a second pivoted lever mounted by means of a second shaft located at another end of said first pivoted lever, a sum of lengths of said first and second pivoted levers equalling a distance from said first shaft to said first location or said second location, said first and second pivoted levers configured to sweep through a plane parallel to the major surface of the substrate;

a drive mechanism for rotating said second pivoted lever in an opposite pivoting direction and with a predetermined gear ratio with respect to said first pivoted lever, the predetermined gear ratio, n , being defined by the formula $n=360^\circ/\Phi$, the drive mechanism coupling said first and second pivoted lever such that the second pivoted lever is in an extended position with respect to said first pivoted lever when the first pivoted lever is in either said first end position or said second end position; and

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a semiconductor chip gripper seated at an opposing end of said second pivoted lever.

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